Merry Christmas

VOL. III. No. 8

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Diamond Turning. *See Page 11.*

The A.S.T.E. Journal

Official Publication of the

AMERICAN SOCIETY OF TOOL ENGINEERS

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The A.S.T.E. Journal

Published on the First Thursday of Each Month for the

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A Merry Christmas

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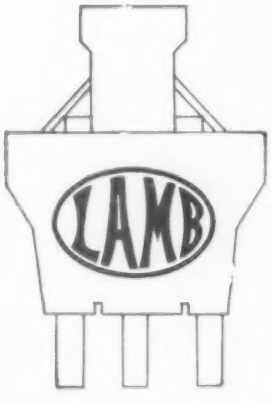

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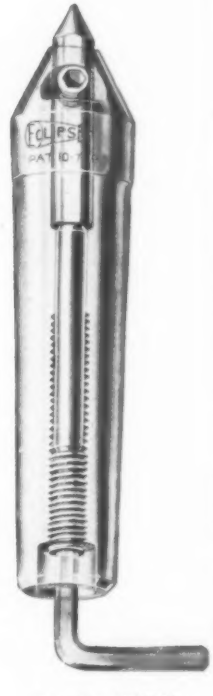

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DECEMBER MEETING

(DETROIT)

HOTEL FORT SHELBY BALLROOM

December 13th, (Thursday)

(Not a Dinner Meeting)

MEETING 8:00 P. M.

THREE SPEAKERS

"EXTRUSION OF PLASTIC MATERIALS AND METALS"

Speaker: **A. E. RYLANDER, Member American Society of Tool Engineers.**

Mr. A. E. Rylander, better known to fellow embers of The Society as "Andy" is an example of manufacturing executive who has "come up from the ranks." Some twenty-five years ago Andy was an apprenticed machinist, and since has successively risen to tool maker, foreman, plant superintendent and master mechanic. Andy's specialty is automatic machine design on multi-spindle equipment and hot and cold swedging. His experience embraces, comprehensively, designing and experimental engineering.

"EDUCATION IN INDUSTRY"

Speaker: **SAMUEL F. WILSON**

Mr. Wilson is supervisor of the Tool Control Department at Hudson Motor Car Company, Detroit. At one time he was connected with the apprentice school of Cadillac Motors and later with the Ford Trade School. He has an unusually interesting and instructive paper to present on the subject. His long interest in training projects in industry equip him very well to speak with authority.

"MONEY"

Speaker: **LUCIUS EDWARD WILSON**

This speaker is unusually well qualified to speak on the subject assigned to him. The other speakers on this program will speak on subjects tool engineering members are somewhat familiar with and accordingly need no detailed description of their talents and experience, however the subject of Money or Finance is one that tool engineers, naturally, are not so familiar with. Judge, for yourself, the qualifications of Mr. L. E. Wilson to speak on this important subject from the following extract from Who's Who in America—"Asst. Secretary Detroit Bd. of Commerce, 1905. Executive Sect'y Greater Des Moines Bd. of Commerce 1906-10, organized movement for new city governments or chambers of commerce in more than 100 cities up to 1921; founder 1914 and managing director Am. City Bureau; Vice Pres Am. Civic Association, Detroit Zoological Society. Republican. Has written a treatise on "Meaning of City Boosting."

Post Nobulus Phoebus **(Liberal translation) "Refreshments after the meeting."**

(Refreshments are free)

PRODUCTION PERSPECTIVES

●●●●●

These are the busy days in Detroit, what with plants working twenty-four hours a day, and a scarcity of trained tool engineers—why shouldn't they be? Programs are under way in many plants —to mention Ford and Packard in particular—and General Motors changing models in two divisions, only, for the present. What *is* the reason for this optimism we *feel* these days and *see* as well . . . . . Vickers, Incorporated swamped with government work and Mr. Vickers usually "out" —in his Washington office, ... and "H. R." Krueger in his new -old plant going full tilt . . . . . and, with many of his old men back with him.

Then, there's Buhr Machine of Ann Arbor, going strong and we hear B. L. Diamond, good A. S. T. E. member is designing drill heads and applications for Buhr in the Detroit office. Big Dave (Turkey) Forsman of Sterling-French, already has several sales chalked up on that horizontal broaching machine for cylinder blocks . . . . . or what have you . . that he and the gang of A. S. T. Eers. at Colonial Broach developed.

Yes, things are going to happen in '35 if some of these rumors we have been hearing are true—and a percentage of them usually are . . . two motor manufacturers coming out with "pushers" . . . motors in the rear . . . completely streamlined . . . . . minus hundreds of conservative parts, such as propellor shafts, universal joints, etc. Then just a week or so ago came the announcement from Lansing that Olds is doubling plant capacity . . . . . spending two and a half million, to produce one thousand cars a day . . . with McCuen, company official stating "Olds anticipates the biggest year in its history. The quota set for 1935 is in excess of 1929, which to date has been the biggest year Oldsmobile has ever experienced."

The National Machine Tool Builders' Association held their annual meeting the other day in Cleveland and elected C. J. Stillwell of Warner & Swasey, President . . . . Norman D. MacLeod of Abrasive Machine Tool Company, First Vice-President, and Clayton R. Burt of Pratt & Whitney, Second Vice-President, while H. H. Pease of New Britain-Gridley Machine Company will be new Treasurer.

A. S. T. Eers. who attended the November meeting in Detroit went home enlightened by a very able speaker, to say nothing of the excellent food that all enjoyed. We'd like to know why every A. S. T. Eer. in Michigan and Toledo wasn't there . . . what's become of Harold Johnson . . . we havn't seen him at A. S. T. E. meetings for some time . . . how come Harold? Maybe you're too busy at Cadillac . . . or, have you been landing "bucks" up north? And speaking of bucks . . . . ask Frank Gertiser for a slice of venison, he was up north and got a big one. Stone Enberg is one A. S. T. Eer. who certainly enjoys his A. S. T. E. meetings "esk," Stoney. We hear that Henry Rourke has enquired when he is to ride the A. S. T. E. goat. Norman G. Brownsward thanks our good A. S. T. E. director Joe Lannon for his suggestion of meeting prizes . . . Your editor wants to know, Joe, did you get a taste of turkey?

If you havn't read, already, Otto Winter's story on tool engineering in Russia on the five year plan, turn to it now. Otto loyal and youthful A. S. T. E. member has what it takes to go places and do things . . . . . he is, now, assistant chief engineer at Whitman & Barnes and is manager of their cutter division.

Independent Pneumatic Tool Company of Chicago we hear has advanced Niel C. Hurley, Jr., to Secretary of the company. Hurley, for years, has had charge of the distribution of the company's electric tools. Jones and Lamson, next month, we hear will announce new machines.

Walter Roe, old-timer in the tool engineering world, formerly master mechanic at Oakland Motors has recently been made master mechanic at Hupp Motor in Detroit. Copeland Refrigerator evidently is planning bigger things—moved their plant in Detroit—Holden at the Grand Trunk R. R. . . . . George Lindgren is Chief Engineer . . . . . the new plant is in production on commercial units . . . planning for goodly production of domestic units in the near future. Speaking of refrigerators . . . . . Fred Hartley is now Plant Superintendent, we understand, at Universal Cooler . . . . with William KuKuk his assistant . . . both men formerly were in executive positions with Continental Motors.

Otto Gron, formerly of Clayton & Lambert, Detroit and well known to A.S.T.E. members is now back with Hudson Motors—in charge of the stamping department at the Gratiot Avenue plant. Guy Hartsock one of the first A.S.T.E. members has been promoted to Master Mechanic at Hudson Motors. He was scheduled to address Detroit members of Society of Automotive Engineers December 3rd on "Large Dies & Stampings" . . . . . Frank Hartlep loyal A.S.T.E.er and on the early *A.S.T.E. Journal* staff, has left Timken Axle and now is assistant master mechanic with General Spring and Bumper. . . . . We heard from Gene Gent, the other day, many A.S.T.E.ers know him . . . . . he is now purchasing agent for Willys in Toledo . . . . . Dave Wilson (Wilson Foundry) is the receiver for Uncle Sam. Gene says 3,500 men will be taken on early in December and the new Willys car is greatly improved in appearance . . . . . going to sell for around $400 we understand . . . . . probably America's cheapest car.

THE MACHINE TOOL INDUSTRY

AND ITS RELATIONSHIP TO THE

AUTOMOTIVE INDUSTRY

★ *by Ralph E. Flanders*

President, American Society of Mechanical Engineers

The unusually instructive and interesting address of Mr. Flanders, delivered before the November 8th meeting of the American Society of Tool Engineers in Detroit, is given here in part only. Limitations of space unfortunately will not permit reproducing all of this excellent and worthy communication to The Society membership, from one so well known and respected in industry.

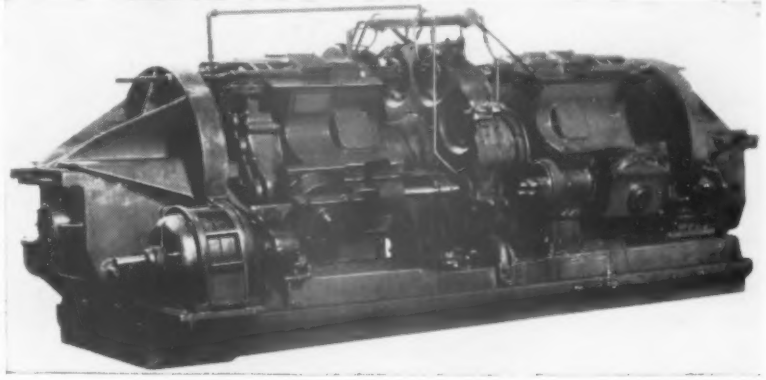
The automotive industry has had an exceedingly interesting history as seen by machine tool builders. Its particular interest lies in the fact that it is a typical history. What makes it outstanding is the fact that it has been so tremendous that it is history and was visible without looking for it. In the eyes of the machine tool builder since the start, certainly since 1902 and '03 and '04, from there on it has been the most visible development. We have been grateful for it. The industry, so far as the equipment and methods you have been using would appear roughly to have divided its history into about four periods.

The first development state, you know what the automobile looked like in 1903 and '04 and '05. You look at the Cadillac, the one-lunger of that date; the Reo roadster, the Locomobile—some of the others and there wasn't the slightest resemblance between them. The only thing in which they all were agreed in body design, none of them had a horse in front of them. No one could say just what standardized form the automobile was going to develop. It was the development period, the standard machine shop tools, the period of standard milling machines and standard drills and lathes and turret lathes and all sorts of regular machines. During that period the business rapidly increased in size and more and more of the standard machines were required. The machine tool industry was in its happiest state.

Then followed the period in which the designs began to get closer together. The changes from year to year were less and less extreme so that the parts of last year's model bore some slight resemblance to this year's model. As that time came on and as various units of the industry went into large scales of production, there was the large scale production period. In the place of standard type milling machines, etc., the plainer type milling machines with sometimes various heads of special sorts, but generally the plainer type milling machine. The turret lathe still held its own. Automatic turret lathes began to come in and there was the beginning of some rather specialized machines.

The next step was from large scale production to continuous production. A phrase often used by journalists is mass production. That term has always seemed to be a meaningless one.. The significant change is not the change from large scale to mass as simply multiplying the largness of the preceding period. There is a very definite change in equipment and procedure that affects your work and mine. It comes at the time when your volume is sufficient so that you can keep one machine continuously on one line of production. When you set up the machine for one operation on one piece, you have entered an entirely new era so far as equipment is concerned, the era of continuous production was a really new era.

I think most of you will remember the period when there was a very large amount of completely special machinery. This appeared particularly in such things as specially built milling machines for cylinder blocks and other members and in the various two or three or four-way drilling machines and things of that sort. Now, unfortunately, those highly specialized designs were made completely for that particular piece and the dreams of the stabilization of design in the automobile proved to have been dreams. The intensity of competition, which developed five or six years ago, which lead to a new struggle for novelty in such things as four-



•An examp'e of a special machine of the special machine period mentioned by Mr. Flanders. The above reproduction was made from probably the only photograph in existance. The weight of this extraordinary machine was in excess of thirty-eight tons and it was designed to perform something like one hundred operations at once.

wheel brakes and free wheeling, which has since gone to every imaginable part of the automobile, tended to put a damper on this building of special machinery which was purchased purely special and unadaptable on any other part. One company in particular, which was thoroughly convinced of the notion that the automobile design was established, spent many millions of dollars in tool equipment, highly specialized machinery, which proved to have very little use in the short period of twelve months—and in one case even shorter than that. It was found to be obsolete due to changes in design.

The fourth period is the period in which we are. I don't know if it is the last period. Anyone who has genius enough to forsee if it is the last period and whether we are going to still another phase and had the genius to forsee what that would be—certainly would be valuable to someone. The phase in the period of continuous production with constant shifting in design—that, you can readily see, brings about a type of machine equipment which is different from the equipment used before the perfection of the automobile had been reached. There have been two or three variations in method of developing machine tool requirements of demands for very high output and low cost on the one hand and the ability to shift that equipment over into parts of quite a different source, perhaps, the next season.

One of the most fundamental ideas which has been followed in meeting the fourth and most difficult phase has been to make designs adaptable to changes. Such things as these plainer type mills with special heads and spindles, etc., are many of them at the present time—those which are best designed, parts which can be taken down and put together in new ways, the drives and feed mechanism, spindles are all standard and have a high salvage value in the machine on account of these standard units. The same is true of the way drills built up of unit driving mechanism. The felt spindle heads for any design of machine. Some machines, which while they may have to be rebuilt so far as their arrangement is concerned, which yet contain highly adaptable units which have high salvage value—is one of the ways in which machine tool designers have endeavored to meet the requirements of your industry from the continuous low-price production and a constant varying design of the part to be made.

The growing excellence in design, which you will find embodied in all the machinery of all makers, which has been produced to meet the fourth stage in the automotive production, takes a great many forms, of getting greater power through more durable and effective and smoother driving elements to the work spindle or cutter spindle. It takes the form of having much finer made driving mechanism and much greater drives, very much better bearings, very much larger use of ball-bearings. These things are all familiar to you. It takes the form particularly of centralized and dependable lubrication of all the elements of the machine. It takes the form of beds and frames and structural members very much better suited to meet the deflections, due to the cutting forces—so that the work can be performed more rapidly and more accurately. In the case of handling the machine—none of these things in their farthest element of requirement, so far as machine tool builders are doing and can do today—to meet a new productive program so that both the machine tool builder in being able to give some continuity to manufacture—but you as users are benefitted by this fourth phase; and I think it is interesting that the instability of design which has brought about these changes in the design of machine tools—while it has given the automotive engineers themselves much more trouble, much more pressure, has on the whole been a good thing for the machine tool builder and machine tool design.

Another element which has come into this fourth phase is the adaptability of machines and improved excellence of mechanism. You know that as well as anyone in the country knows it. There have been such minor matters as the discarding of the trucking operations on the lathe work for the simple drilling operations, having a very high speed, rapid chip removing process to the place of a somewhat leisurely process, as was the case when holes were finished on the hand or automatic turret lathe, finished on a much simpler tool. Then, there are such things as automatic gauging in drilling, diamond boring, centerless grinding—still newer developments in milling operations and broaching operations. Those of you who went down to Cincinnati and saw the broaching machines working—saw a machine which involved most of the principles which we have been discussing. It is a machine highly developed so far as ease is concerned. It employes a new and very rapid means of removing stock which promises to be capable of being standardized of building in some quantity and becomes perhaps the cheapest and most valuable method at the present time of making some types of work.

We have also, I am sure, while in all cases perhaps, a higher cost per machine. We have not merely a lower cost (labor cost) of the production, but in some cases, which I have examined, we have a lower cost of equipment for a given output. That simply means that the rate of output for these machines has increased more rapidly than the machine has. When we look at the price of the machine today and the one of some ten or twelve years ago, we may be disturbed at the increase of price. If we look at the increase in output, I think we will find the cost of the equipment for the given output is less than it was ten or twelve years ago.

I just want to say one thing about the durability of the machine. The durability and adaptability which the machine tool builders manage to get is both our pride and despair. To build machines which are durable—to see them enduring year after year, long after the automobile—to see them is one of the most discouraging things a machine tool builder has to face.

The usual criterion by which you gentlemen and your organizations determine whether or not it is wise to purchase a new machine tool—the usual criterion is based on the length of time it will take the machine to pay for itself. That is a thoroughly practical criterion, but I wish to suggest to you two

(*Continued on page 18.*)

TOOL ENGINEERING IN RUSSIA

by O. W. WINTER

Member American Society of Tool Engineers

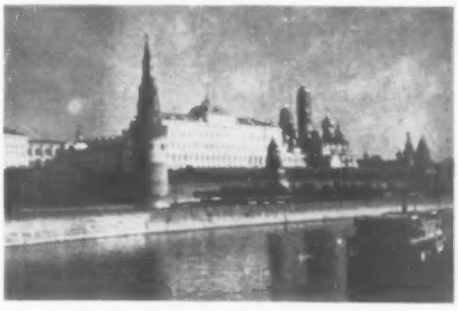
It is not an easy matter to speak on so controversial a subject as the U. S. S. R. There probably has been more said pro and con about this broad strange country and the things that have and are going on there than about any other outstanding thing since the world war. Further there are perhaps stronger opinions pro and con on the subject of the U. S. S. R. and all it embraces, than on any other like subject. Hence a speaker on the subject is usually condemned as a liar or praised as a disciple by his readers depending mostly on their preconceived opinions. Hence to avoid both I am going to steer clear of such controversial rocks, it is sometimes better to straddle than struggle.

The facts are that most everything that can be said in disfavor of things pertaining to Russia today can be explained more or less, depending upon one's previous opinions. But it has been said that if there is one thing that characterizes an American, it is that "he has a sense of humor and proportion". Hence it is recommended if one wants to find out what Russia is all about read both sides of the story. Carveth Well's "Kapoot" paints a pretty black picture, on the other hand Maurice Hindus' books, while carefully written are distinctly not anti-Soviet. J. N. Darling in his book "Ding Goes to Russia" gives the average impression of an unbiased American tourist. Yet the best way to learn about Russia is to live there long enough. Even then one's reaction to everything concerned will largely depend on how he managed to get along, how he was treated—and, unavoidably, his opinions before going.

The facts are that one could not live in Russia, during the period of our story as comfortably as in America unless he spent plenty of valuta (foreign currency) or was an otherwise privileged character. Expecting this helps soften, to a certain extent, the hardships encountered.

The writer spent a very interesting and trying year there as a consultant to the machine tool and cutting tool trusts. Every division of industry and commerce is under a central trust, usually with headquarters in Moscow A number of trusts in turn form a commissariat. For example the Commissariat of Heavy Industry covers the production and distribution of productive goods, the Commissariat of Light Industry consumers goods. Then there are Commissariats of Transportation, Finance, etc. etc.

This is "Otto" and Mrs. Winter dressed in typical Russian attire. Otto seems to have everything but the whiskers.



The Kremlin—symbolical of the old Russia, which is no more.

The heavy industries under the first five year plan were built, under the second five year plan, the efficiency of these industries is to be improved and more attention given to the light industries. For Tool Engineers the heavy industry is of primary interest. To build plants, buy foreign made machinery and install it is one thing, to make these plants operate with some degree of efficiency is another. Hence the second five year plan. To change thousands of ignorant peasants, who didn't know even the use of the simplest of metal working tools into an army of skilled and unskilled machine operators, technicians, engineers and executives is a task, the thought of which staggers one who has some idea of the ground that must be covered. Taking boys and girls in this country off the farm and trying it would be much easier. It could not be done in this manner in several five year plans.

How long will it take Russia? In spite of this tremendous initial handicap with the added ones of sabotage, indifference, cocksureness, laziness, etc. there is tremendous progress being made. What if a plant operates at 10% efficiency, it is producing something and that is usually much more than before the first five year plan. Hence to the Russians this is quite an accomplishment, to an American Engineer it is quite something else if he thinks in terms of what should be or could be done at home with the same plant and equipment.

On one hand one sees a bright young fellow that makes one wish there were thousands more of the same kind but alas the others are not so encouraging. It is significant in this respect that young people predominate in the industrial setup—it seems that young heads grasp the idea easier and then there are more profitable years ahead on which to realize. Also there are a great number of girls employed in factories. All due credit to the Russian men, the women are better and steadier workers and grasp the idea just as well and I might add don't let it go to their heads as much. There seems to have been a lot of latent engineering talent in the sons of proletarian families. This talent is certainly getting its chance to develop, some of the results are encouraging, others not. As a whole however these young Russians are literal sponges for knowledge. Most of them will exhaust one with questions but if caught in an argument in which they think the foreign consultant is wrong,

time and important action mean little while there is anything left to argue about. Here we will go ahead and make something that will work and have it in operation while the Russians are still arguing about whether or not it will. In this country practical experience is respected, in Russia they like to have theoretical proof first. Sometimes this is not only difficult but impossible. One has to be somewhat of a professor to be convincing.

Everything in Russia is done according to a plan. Such a plan usually covers the matter of quantity, time and money. If a factory is to produce a thousand gadgets in a month, the time when drawings are to be finished, tools drawn and made, raw materials ready, etc., etc, is set down along with the money alloted for each, much the same way as here. The catch comes in the intelligence displayed in making the plan and then the same in carrying it out. It is a Russian characteristic to have little respect for the importance of time. This is often fatal to plans and schedules. There is a big job ahead to change this old custom. To go from Detroit, in particular, to Russia is probably the extreme in this respect. *Zaftra* (tomorrow) is good enough. If zaftra was really intended as tomorrow, well and good, but the difficulty is that it may be better translated as just "later." When results depend on coordinated efforts of various departments all working to a well planned time schedule, the troubles are only begun. But the importance of time will be respected eventually or all the five year plans will fall short. This change in Russian character will not come quickly, it will probably take a generation or more and threats, persuasions, contests and shameing in the meantime will continue to be used to get results. Human nature cannot be changed overnight.

Another deterent factor in this regard is the Russian's love to hear himself talk. If half the time spent talking and arguing was spent in doing, it would be a blessing to the foreign specialist or consultant, at least.

Russia is drawing from the technical experience of the entire world. This is both a blessing and a curse. True they can select the best but also sometimes they don't. Tools, equipment and methods that may work well in Germany for example may not be at all suited for Russian conditions. But the German engineer defends the way they do it at home and so does the American and so on. The conflicts resulting are numerous and time consuming and exasperating. The writer for a time was the only American in a plant among seventy Germans and this plus plenty of other like experiences confirms the above.

It seems that Russia would be smart to follow American practice closely inasmuch as conditions are quite similar to that in certain American industries. Russian workers are mostly unskilled and are very abusive of equipment. American machine tools stand the punishment better than any of the rest. The same holds true in tooling up a job. The way it is done in Germany or England usually differs considerably from our practice here. In Russia it is almost essential to transfer the skill from the man to the machine. This is more in the manner in which we do things here. In their automotive and tractor plants American practice has largely been followed. What has been overlooked in the application of these methods is the army of tool engineers and maintenance men required. There are not enough repairmen to keep pace with the destruction wrought by unskilled and ignorant operators. In machine tool plants and the like there has been too much reliance placed on the skill of the operator. The results are an immense amount of scrapped work, and parts that don't fit. In these shops there is still discussion on and investigations being made regarding the desireability of and problems involved in securing interchangeability of machine tool parts. There is hardly a machine tool plant in this country that does not operate on such a basis. The Russians with their immense demand could produce machine tools and cutting tools on a mass production basis and with mass production methods more than even the most advanced of our firms in this country.

There is a crying need for American Tool Engineers in practically every shop in Russia. The writer when asked by the manager of an engine lathe plant what his impressions were of their methods caused quite a furore when he stated that there wasn't an operation in the shop that couldn't be improved on. This was the truth however and is probably indicative of every shop in Russia today.

The U.S.S.R. no doubt has a well equipped and manned army. There is the same arrangement of superior and under officers, privates, and so on that is in every modern army and there is discipline. They also have a medical corp. A factory to operate efficiently must have a similar organization and there must be discipline. Unfortunately this is not true in most Russian factories. There has not been enough planning and attention given to the development of the officers of the factory, executives, foreman, tool engineers, production engineers and also the maintenance men, the "Factory's medical corp." In spite of this, progress has been made altho it is not to be compared with what could have been or yet could be made.

The question is often asked why did the Russians buy such elaborate equipment, why not start with simple equipment and teach their workers gradually to use the more expensive and elaborate machines? The question has been answered for the writer somewhat as follows: "With an appreciation and understanding of Russian character, one realizes that the Russians are great on enthusiasm and poor on plugging away. They are great starters and poor finishers, in other words, they cool off quickly. To give them shops with simple easily operated machines would lack the necessary glamour. In order to keep enthusiasm alive it was necessary to put up the last word in the way of plant and equipment and say 'Russians here's one of them, keep at it and we'll have hundreds like them, the last word."

The Russians have a slogan "Catch up and surpass the Capitalistic Countries." This is an inspiring slogan, to be sure, but it is a very ambitious one also. Whether it is over-ambitious remains to

(*Continued on page 20.*)

We extend the

Greetings of the Season

and wish for all members
and friends of the

American Society of Tool Engineers

continued success and
prosperity

SWEDISH GAGE COMPANY OF AMERICA

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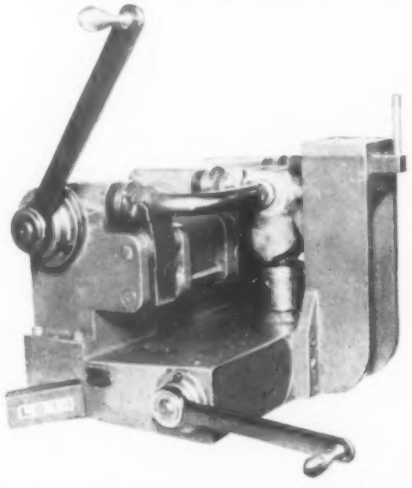
SWARTZ SUGGESTIONS



To water test this manifold and not spring the parts out of line was easy. Two standard one-inch locks were used to close five openings.

The compensating mechanism to support clamping is automatic.

Two locks to close five openings—Water test without springing—Designed and built by—

SWARTZ TOOL PRODUCTS CO., INC.

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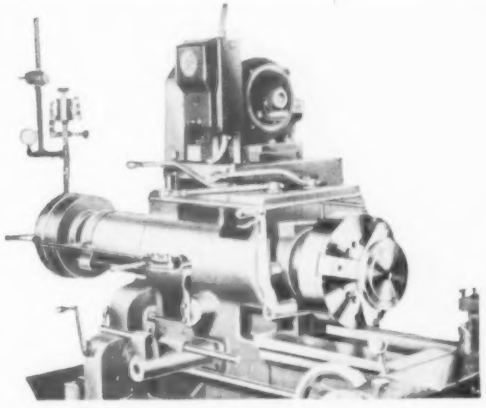

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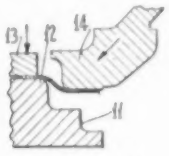
RECENT PATENT GRANTS OF INTEREST TO THE TOOL ENGINEER

METHOD OF AND APPARATUS FOR DRAWING SHEET METAL

George L. Kelley, Philadelphia, Pa., assignor to Edward G. Budd Manufacturing Company, Philadelphia, Pa., a corporation of Pennsylvania

Application March 18, 1931, Serial No. 523,444
5 Claims. (Cl. 153—25)



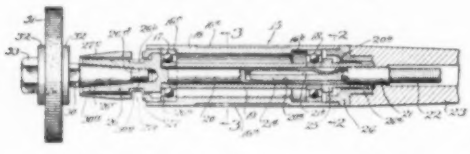
1. The method of forming a continuous flange on an interior substantially square corner of a substantially flat metal sheet which consists in first cutting out the sheet to leave ample metal to form the corner flange, then holding down the sheet outwardly and on both sides of said corner, and engaging the metal of the sheet by a drawing tool having the contour of the corner to be formed inwardly of the final corner to be formed and drawing it from both sides toward the corner and downwardly to the depth of the draw.

4. Apparatus for forming a continuous flange on an interior substantially square corner of a substantially flat metal sheet comprising peripheral hold down dies adapted to clamp a blank, a female die having an opening with a corner contoured to the contour of the flanged corner to be formed, a male die having a corresponding contour, and movable downwardly and outwardly into mating relation with the corner of the female die, whereby it first engages the metal of a blank inwardly of the corner and draws it from regions remote from the corner toward the corner in its subsequent movement.

GRINDING AND POLISHING APPARATUS

Herman Goldberg, Chicago, Ill.

Application October 1, 1931, Serial No. 566,201
2 Claims. (Cl. 51—170)

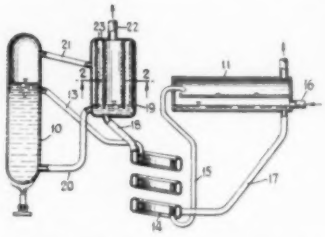


1. The combination in apparatus of the class described, of a rotary flexible driving shaft, a tube mounted at the end of said shaft for engagement by the hand of the operator, a spindle shaft in said tube operated by said driving shaft, a rotary head actuated by said spindle shaft and having a tapered socket provided with a threaded bore at the inner end thereof, a tool carrying spindle having a tapered part to fit said socket and a threaded projection to engage said bore, and a sleeve carried by said tube and surrounding said head, said head having flat surfaces on opposite sides thereof for engagement by a wrench and said sleeve being provided with slots to permit access to said flat surfaces.

ABSORPTION REFRIGERATING APPARATUS

Peter Kohler, Stockholm, Sweden, assignor, by mesne asignments, to Electrolux Servel Corporation, New York, N. Y., a corporation of Delaware

Application March 12, 1931, Serial No. 521,989
In Germany October 25, 1930
12 Claims. (Cl.. 62—119.5)

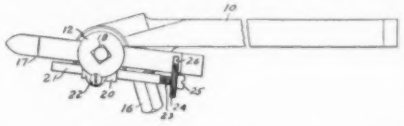


4. In refrigerating apparatus of the absorption type, raising enriched absorption liquid from the absorber by capillary attraction to a surface contacted by vapor from the generator.

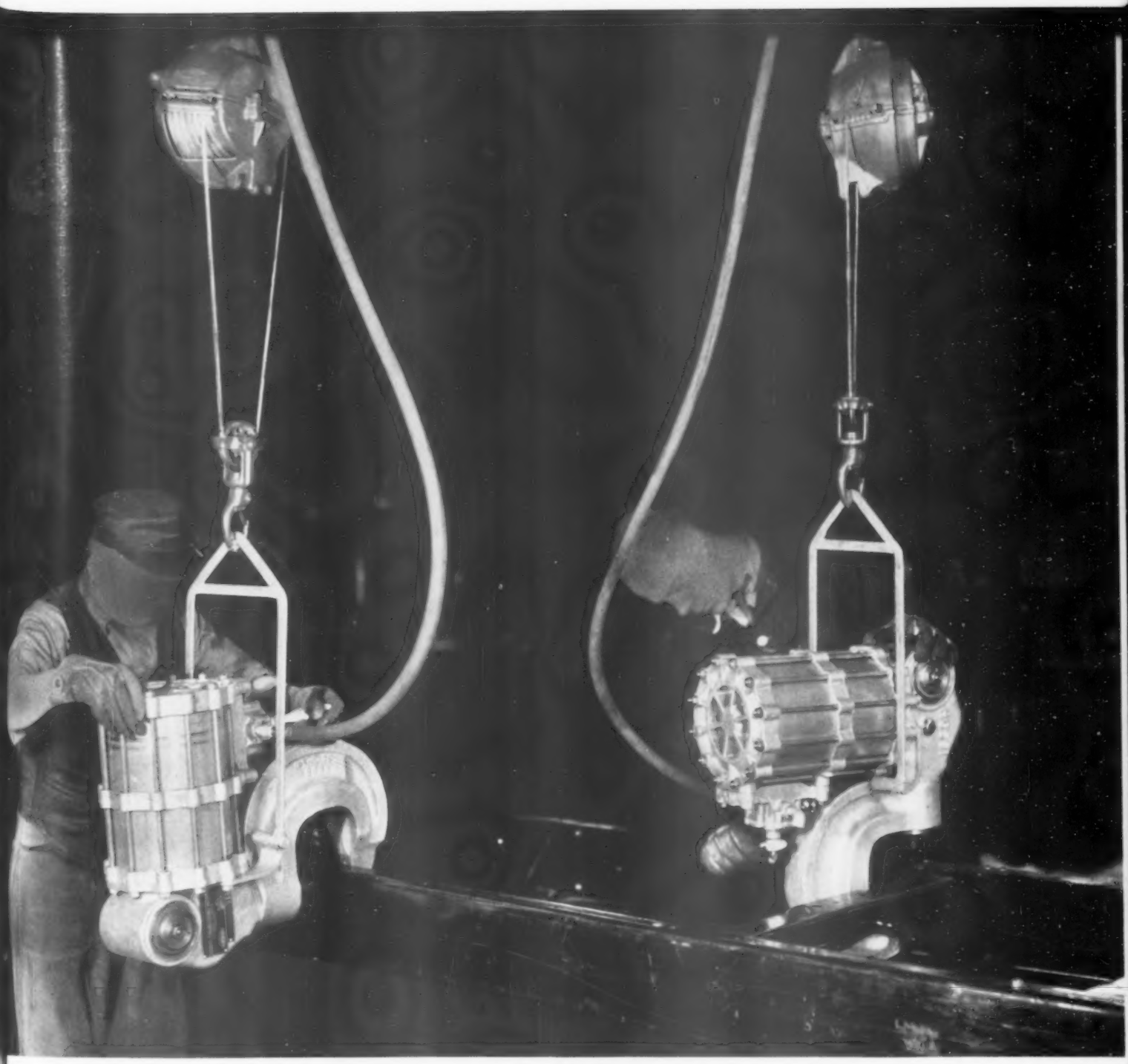
RADIUS TURNING TOOL

Harry J. Chedster, United States Navy

Application February 1, 1933, Serial No. 654,690
2 Claims. (Cl. 29—98)
(Granted under the act of March 3, 1883, as amended April 30, 1928; 379 O. G. 757)



1. Means for adjustably securing a tool in a tool holder for quick rough and quick fine adjustment comprising a pair of parallel shaftways extending through said tool holder, one of said shaftways slidably receiving said tool herein, a shaft slidably received in said second shaftway, means extending into each shaftway for individually locking and said tool and said shaft against movement, means on said shaft adjustably securing said tool to said shaft, whereby said tool and shaftway may be moved simultaneously as a unit for rough adjustment when both locking means are unlocked and may be moved relative to each other for fine adjustment when one of said locking means is unlocked.



HANNA PORTABLE SQUEEZE RIVETERS

Hanna Portable Squeeze Riveters drive rivets cold with one stroke of the piston. These riveters are compact, light weight and so balanced they may be used in any position. Recommended for driving up to and including 3/8" rivets cold and 5/8" hot. Yokes designed to meet every requirement.

● ●

HANNA ENGINEERING WORKS

DETROIT OFFICE—TELEPHONE UNIVERSITY 12232

1765 ELSTON AVE. CHICAGO, ILLINOIS

THIS MONTH'S COVER

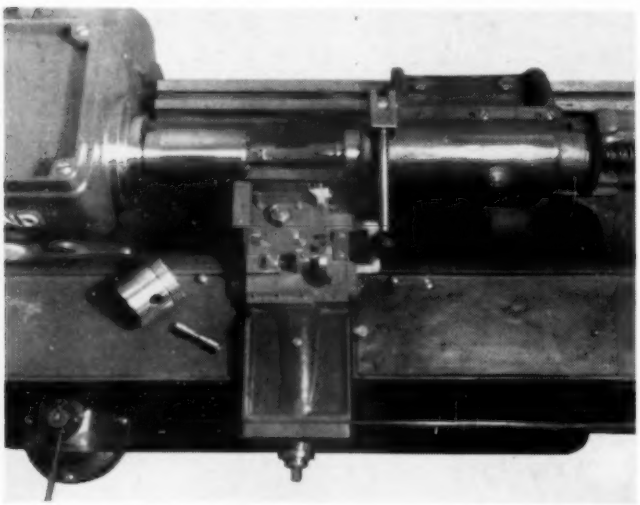
By D. Blair Burleigh, Sterling-French Mchy. Co. Detroit

Considerable interest has been shown over a period of the past year or so by automotive engineers, and those closely connected with the problems of the industry,regarding the relative merits of diamond turning vs. grinding of aluminum alloy pistons for a finish.

Experiments have proven that there are certain advantages in a diamond turned piston, the most important of these being that greater accuracy can be obtained owing to the low tool pressure on the work; also diamond turning affords a better finish inasmuch as the diamond cuts clean producing an excellent finish as well as exposes material defects, such as large pit holes whereas in the grinding method, the wheel has a tendency to load these pit holes with abrasive material which is obviously detrimental to the honed cylinder wall.

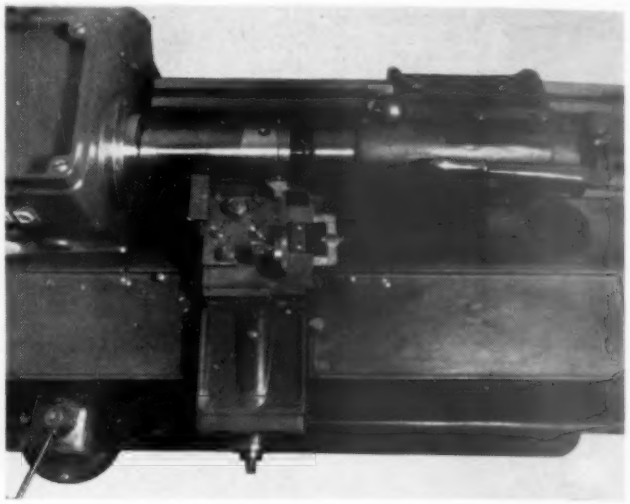
While it is generally conceded that the diamond turned piston has many advantages, there also have been several knotty problems involved in the development of equipment to diamond turn satisfactorily,-especially in the development of a spindle to withstand the high spindle speeds up to 3,000 R.P.M. without vibration causing chatter to the work, and the development of a copying mechanism to produce the oval or eliptical shapes that are now being used.

After two years of constant effort in designing and experimentation, the Sundstrand Machine Tool Company of Rockford, Illinois, have overcome the difficulties above described and now offer equipment which will produce a piston which they claim is superior to the ground piston for finish and accuracy.



Photograph above illustrates the oval turning attachment and the master cam, as well as the method of driving the piston, holding the wrist pin hole square to the axis of the oval, the piston being located on the adapter by means of the center in the open end of the piston.

Photograph below illustrates the tooling necessary for the operation. In this instance, the skirt only is being turned. However, it is possible to add tooling so that the ring lands can be finish-turned simultaneously with the turning of the skirt if desired. The master cam is, of course, positioned in the spindle of the machine, and at the left side of the tool block, a fibre block is mounted contacting the cam; thereby as the cam rotates, the block contacting the cam will cause the tool to oscillate to give the desired oval.



In connection with the tool block will be seen a disc and a pointer, their purpose being to provide micrometer in and out adjustment to the diamond for obtaining accurate diameterical dimensions on the piston. The disc is graduated so that spaces of ¼" on the disc propells the tool in and out .0002 of an inch.

Adjustment in relation to the center line of the piston is accomplished by means of a yoke shown at the right of the tool block.

The photograph on the cover illustrates a general view of the machine and tooling, the cycle being automatic after the loading of the piston in position in the machine and the starting of the spindle. Automatic tool relief from the work when the automatic carriage returns to starting position.

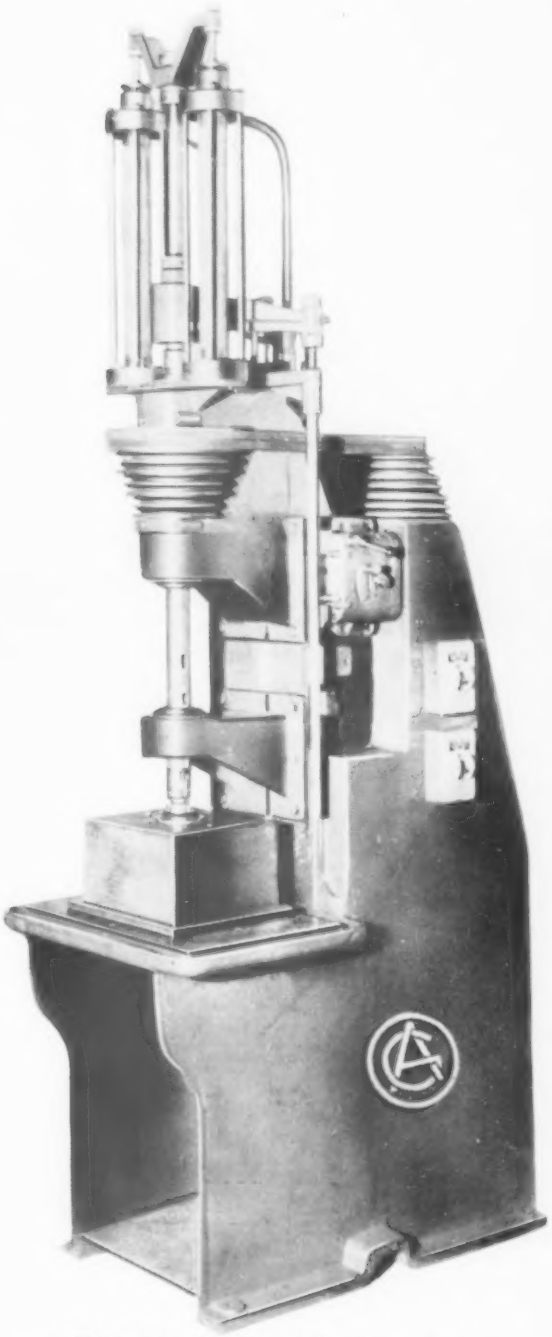
NEXT MONTH

Next month, be sure to read "The Draftsman and Vocational Organization"—a vivid picture of employer and employee relationships, and also how tool engineers will profit by a new field in air conditioning of trucks and busses.

GIERN & ANHOLTT *announce*

a new Boring Machine

THE CARBIDEBORER



This is the machine industry has been looking for. Developed by Giern & Anholtt, with years of specialization in boring equipment and boring tools, this machine surpasses present boring equipment for versatility, accuracy and speed. It roughs—it finishes—it also *roughs and finishes* in *one* operation. It bores to a shoulder—it faces and hollow mills.

Call our representative or write for literature

V-Belt drive, hydraulic feed—semi-automatic.
Upper illustration; Typical samples of "Carbideboring."

GIERN & ANHOLTT TOOL COMPANY

INCORPORATED

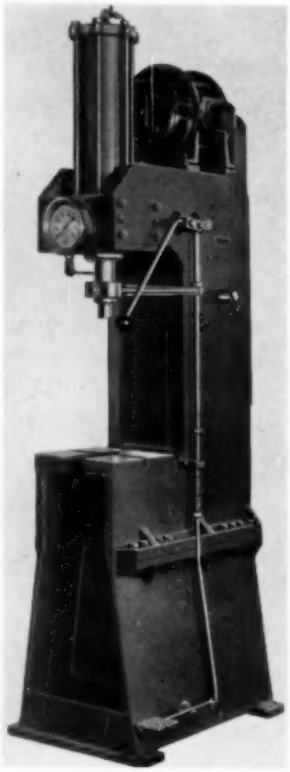
1312 MT. ELLIOTT DETROIT, MICHIGAN

NEW EQUIPMENT

LOGANSPORT ANNOUNCES NEW BROACHING PRESS

Logansport Machine Company, Logansport, Indiana, announces a new broaching press — of all steel electrically welded. The new line will be manufactured from ½ ton to fifty ton capacity. Smaller presses up to 5 ton capacity will be furnished for bench mounting.

The oil reservoir for the hydraulic circuit is in the column of the press. The oil pump, valves, etc. are mounted on a panel and is attached to the column and are within the oil reservoir. The pump is chain driven by a motor mounted on top of press column.

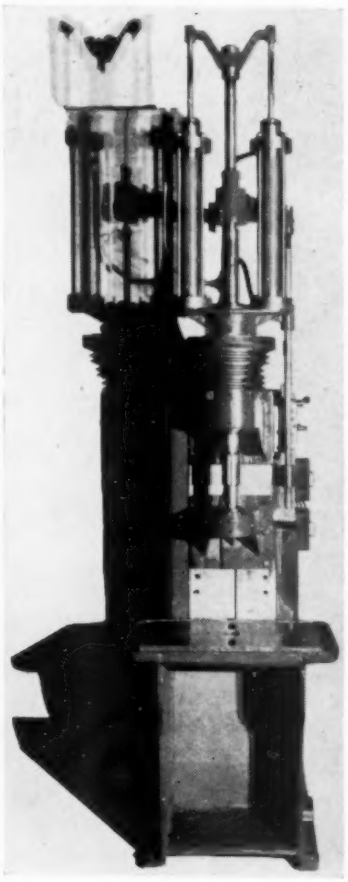


The hydraulic control valve is foot or hand operated. When the operator steps on the foot pedal or pulls down the hand lever the ram makes its down travel. Automatic or manual reverse of ram is provided. Reverse of the ram can be made at any point of down stroke. When ram reaches top position the pump by passes and does not work against pressure. A stop rod is arranged on side of press with adjustable stops for regulating length of down travel and stop of ram at top of stroke. Coolant pump and pan can be provided for press when used for broaching operations.

Tables of various heights and designs can be furnished to suit special requirements. Hydraulic or air operated work holding fixtures will be designed and furnished with press when desired.

A NEW BORING DEVELOPMENT

When new cutting materials such as high speed steel or stellite and now tungsten carbide make their appearance, it is but human to adopt a critical attitude while results are developing. Again—if, this new material seems a good one, it is customary to experiment with it in connection with equipment on hand. This is entirely as it should be, for only through that does the road open up to future possibilities. Then in the course of time a machine might be built solely for the new tool. The Giern & Anholtt new boring machine the "Carbideborer" is such an example. The machine is built for the purpose of utilizing tungsten carbide as a boring medium.



The Carbideborer is built for both roughing and finishing and also simultaneous roughing *and* finishing. The drive is a double vee belt drive. The feed is hydraulic with all its characteristics as to slow fast or jump feed, automatic return etc. There are no gears whatsoever employed in the Carbideborer—this tends to prevent harmonic viberations and its enevitable chatter. The stroke in this model is 18". The feed varies from zero to 315" per minute. The boring capacity ranges from ¾" to 2½" diameter. The Carbideborer works vertical thus the chips are automatically disposed of. The spindle pulley is run independently in ball bearings and the spindle proper is fed through G-A-T Co. rotary bushings, the drive is accomplished with a floating key. The boring tool or bar fits in the #4 MT. in spindle nose and is guided through either one or two G-A-T rotary bushings—depending on the depth of bore desired. One G-A-T bushing is permanent on the adjustable arm, this is the rear pilot bushing, the other or front bushing is mounted either in fixture or the machine table. By thus guiding the tool through close fitting rotating bushings, and insuring a vibrationless and fully supported travel in its full length, roughing becomes as practical as finishing has been for some time.

A. S. T. E. SPEAKERS' CLUB BEING ORGANIZED

A speakers' club, similar to last year's speakers' club is now being organized for the membership. The meeting night is to be Tuesday evening and classes will be held in Mr. Robert Lippard's office at 2832 East Grand Boulevard and at the Secretary's office, 8316 Woodward Avenue.

The course will be under the direction of Mr. Harry Heffner, who coached the speakers' club last year. The fee has been changed this year to five dollars for the series of ten lessons—payable in advance.

Interested members should get in touch with the Secretary or Mr. Wm. Smila, as soon as possible.

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ENGINEERED PRODUCTION

EXAMPLES FROM THE SUNDSTRAND FILES

No. 3415

Lathes
Milling Machines
Tool Grinders
Centering Machines
Balancing Tools

Sundstrand Builds A Rise-and-Fall Rigidmil With Hydraulic Feed

"The world do move" and machine-tool builders must move along with it, or ahead of it, in order to stay in business. Sundstrand progressiveness is indicated by the development of a new rise-and-fall Rigidmil shown in Figs. 1 and 2. Operation performed is milling back of intake manifold flanges. Some of the 8 surfaces milled are so shaped that cutters cannot entirely pass the work-piece which makes the operation slow, difficult, and costly on most millers. This Rigidmil does the job quickly, easily, at low cost, and on small capital investment. Column of machine is welded steel. On its top is mounted a head unit having anti-friction bearings throughout; eight horizontal spindles, each with endwise adjustment; and direct motor drive. A heavy casting which has table ways, and a base for the hydraulic cylinder that moves the table, is solidly mounted on the front of the column. Table is clean, unobstructed, has large integral chip pans, and convenient loading height of 41". Hydraulic power unit for table movement is housed in base, and has independent motor drive. Operating cycle, automatic after starting, includes rapid approach to three upper cutters, feed, reverse at end of cut, rapid approach to five lower cutters, feed, reverse at end of cut, rapid return to loading position, and stop. Table movement is controlled by adjustable dogs at operator's left, both motors are started and stopped by push buttons conveniently placed on the right. One operator can run two of these Rigidmils. The simple, accurate fixture contributes substantially to securing high production at low cost.

Fig. 2. Above. Sundstrand rise-and-fall Rigidmil with work-piece removed to show eight cutters on spindle head.

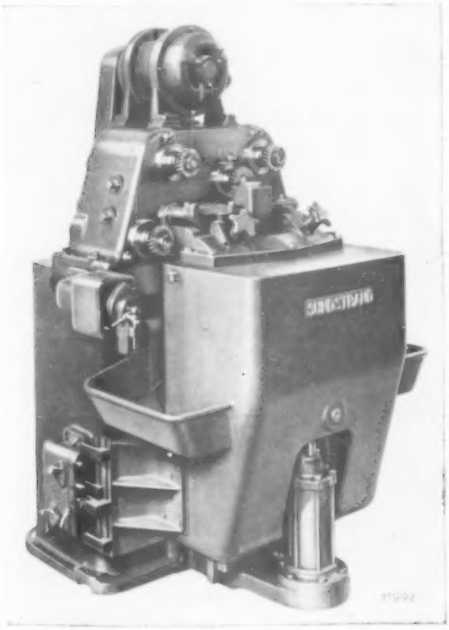


Fig. 1. At left. Sundstrand rise-and-fall Rigidmil with work-piece in fixture. Note hydraulic cylinder at lower front, and adjustable dogs for hydraulic control unit at left.

We believe that this type of Rigidmil has great possibilities for reducing cost and increasing production on a wide variety of work. We shall be glad to discuss these with interested executives, and to submit suggestions and estimates promptly upon receipt of your prints and production requirements.

STERLING-FRENCH MACHINERY CO.

NEW CENTER BUILDING ◆ DETROIT, MICHIGAN ◆ PHONE MADISON 3660

Exclusive Sales Representatives for Sundstrand Products in the Detroit Territory

(Continued from page 8.)

refinements to that method of determining the purchase of a new machine.

The first is this—we have been speaking of the fact that the machine tool which meets the requirements of this particular productive period is one in which a large part of the machine, perhaps the principle part of it, is available for work of a completely different design. It has a high salvageable value. Let me suggst, threfore, that you give different lengths of time for which the complete machine and equipment must pay for themeselves to the durable elements than you do to the special elements.

If you have an automatic lathe with a special equipment, should you not, in fairness to yourselves, allow at least five or six or seven years for that part of the value represented by the machine itself to pay for itself while you allow the tool equipment to pay for itself in one year, which is the longest you can set for the life of the tool you are making. Asking the machine to pay for itself for one year with the tooling and four or five years with the base, which is going to last five years anyway, I am sure our relations would be more delightful. Let's not put it on the basis of delight, let's put it on the basis of profit in the automotive industry.

The second factor to be considered in determining the length of time it takes a machine to pay for itself—the machine can justify its selection in replacing older or less efficient equipment long before the end of that period in which it completely pays for itself. If you set down in parallel columns on a sheet of paper the expense of producing for this year and next year and the year after that or for this month and next month and the month after that—the expense of producing the number of parts per day, which you wish to produce with the old equipment in one column and new equipment in the other column—all the elements which have any considerable value to them not merely labor costs, but depreciation, maintenance, and upkeep and repairs, interest on investment, amortization—on the one side and other—you will, of course, arrive at the point some years hence or months hence, at which the new equipment will have paid for itself. But you have, before that time, arrived at the point where you will be less out of pocket with the new machine than you would be with the old. The new machine begins to step ahead usually long before it pays for itself. You don't have to wait for the final end to have justified your judgment in making the change. At that point where your total expenditures for the new machine are less than the total expenditures of the old,—from that time on you are clear in your change and what you get from then on is velvet in the way of paying for the new machine.

Now, we machine tool men get together and tell over our troubles. One of the troubles that we usually tell about is that of going through a great deal of work in the sales engineering department and working out tool equipment and methods and new schemes for increased production and all in the hope of sales. Then you bring out some ancient, but still usable wreck from the storehouse and put this equipment on it. I think that is the only point on which machine tool builders, aside from the lack of business in general, feels sad in the late hours of the night and the early hours of the morning and gathers with his kind and shares their mutual woes and cares.

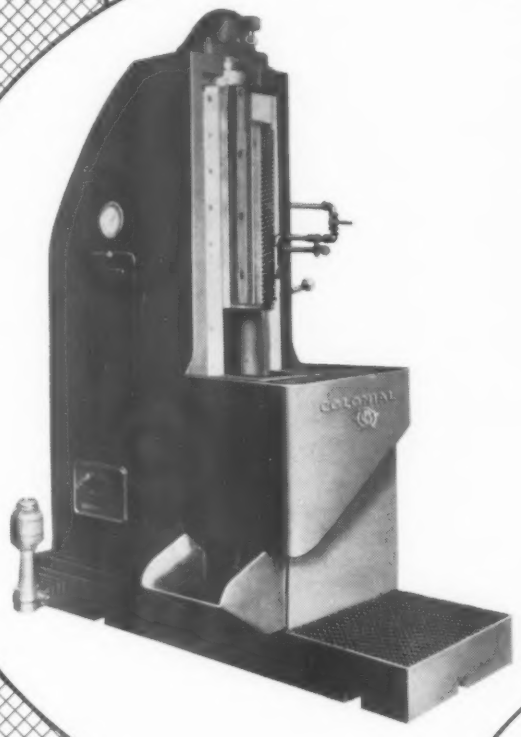
We realize, even honestly, that you have these machines. We realize that we made them fairly durable; and if we were in your places, the chances are we would haul them out and set them to work instead of putting them under the skull cracker as we would like to do. If in the early hours of the morning as we use our best brains and our ability and time in developing these things and the automotive industry gets the benefit, yet we are a little bit overwrought, we exaggerate things a little bit—the honest truth is that in this combination of automotive production men and machine tool builders and engineers we have one of the most marvelous and productive cases of cooperation which is to be found anywhere in the world. I am proud to belong to the industry and proud to be here tonight and meet the men in your industry which cooperate so closely with us.

THE NEW YEAR

What has the new year in store for us? Who is qualified to say what the new year shall bring? *The A. S. T. E. Journal* does not believe itself qualified to make any predictions about this important question, but can call to mind some "straws" which do indicate what appears on the horizon in the year to come and how the tool engineer may profit.

Everyone knows of Henry Ford's intention to produce a million cars in 1935, as hearlded in the press throughout the nation. While it is understood that changes in the new Ford models will not be great so far as the engine is concernned, body changes are comprehemsive—already having involved substantial expenditures for dies, tools and equipment. The entire motor industry appears to be facing the new year with determination and a conviction that more cars will be sold. One rumor heard in Detroit these days is to the effect that a large motor manufacturer intends to establish a wage scale of ten dollars per day.

Another indication of improvement in the year coming is the increasing number of machine tool builders who plan increased advertising expenditures. Frank G. Payson, General Manager of Logansport Machine Company has announced increased advertising for the coming year, after several years of little or no advertising for his company. Asked why he was increasing advertising expenditures for the coming year, Mr. Payson stated, "We are increasing our advertising for the coming year as we believe 1935 is going to be a good year and that money spent for advertising will now bring results. Such advertising as we have been running the past several months has been bringing results, and we intend to capitalize on the existant market, now, by increasing advertising." The important point in this conection is that many tool manufacturers, like the Logansport Machine Company, are backing their convictions with hard cash in increased advertising expenditures.

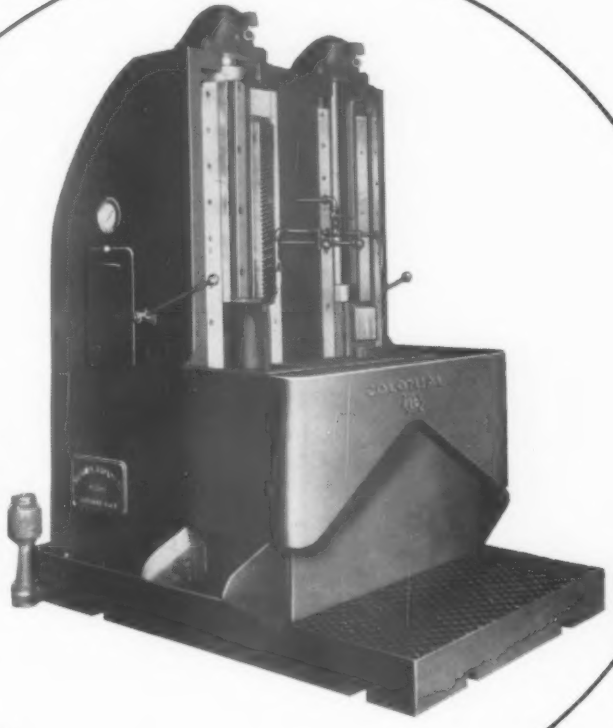


New Broaching Machines

We build a complete range of broaching machines for all purposes, here are our latest machines in range of 24 sizes. Robust and built for hard work and continuous production.

Price extremely attractive.

Full details of these machines will be sent on request—write us.



These machines are available in both single and double rams. From 18 to 54 stroke and 6 to 25 tons. Built on massive lines throughout with first class workmanship in every detail for continuous duty under all conditions.

Write for full particulars.

COLONIAL BROACH CO.

DETROIT, MICH.

The

HOUSE OF AUSTERBERRY

Extends the

Greetings of the Season

(Continued from page 10.)

be seen. Certainly this isn't going to happen by the end of the 2nd five year plan. It didn't happen by the end of the 1st five year plan as some expected, nor will it for a good many more. Nevertheless they are progressing, having started on a much higher plane of industrial and technical development than we or other countries did, and whether they surpass us or not depends largely on what the rest of the world does. It will be extremely interesting to observe as years pass.

The U.S.S.R. must eventually become self sufficient for machines and other productive equipment. They cannot continue to deprive the population by exporting consumers goods, in face of the tremendous demand at home, in order to get gold to buy machinery. Tool engineers are in great demand for this work and will continue to be for some time. It is up to the Russians to make up terms and living conditions that will attract the right quality of engineers, which were not available during the first 5 year plan when the money was and now during the 2nd 5 year plan when good engineers are available there isn't the money to attract them.

In summation let me say however when one sees the nothingness from which Russia has built, they do deserve some praise for what they have done. Russia today is like an oil painting, one must not stand too close to really appreciate it.

Turn to page six of this issue of *The Journal*—"Production Perspectives"—see what's going on in the tool engineering world.

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Presses
Power Devices

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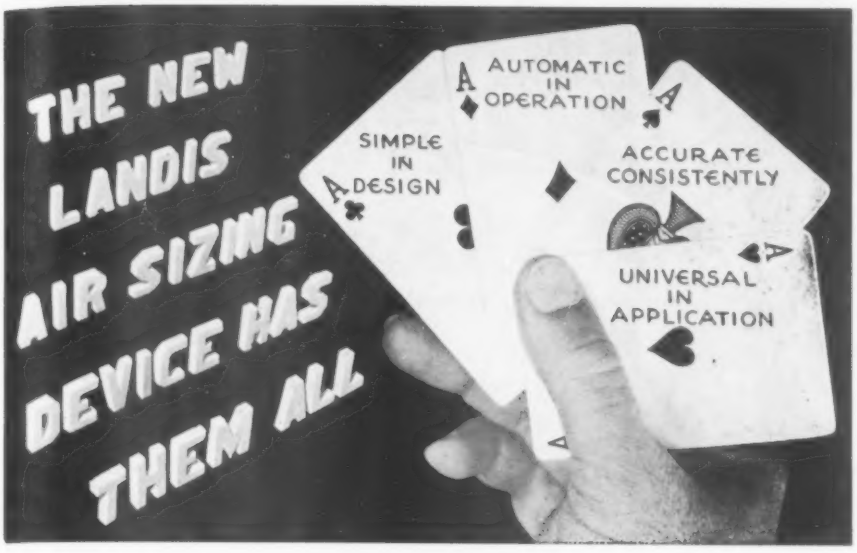

THE NEW LANDIS AIR SIZING DEVICE HAS THEM ALL
AUTOMATIC IN OPERATION
SIMPLE IN DESIGN
ACCURATE CONSISTENTLY
UNIVERSAL IN APPLICATION

THE 4 ACES OF MACHINE SIZING

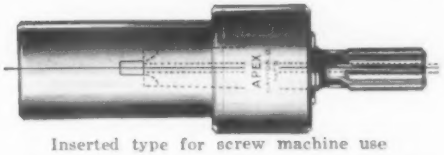
HE who holds four aces is always in a most favorable position. The grinding department with Landis Air Sizing equipped production grinders is in a position just as favorable. Because the outstanding features — or four aces, if you please — of Landis Air Sizing make it the ideal device for automatic sizing.

These features are (a) simplicity of design; (b) automatic operation; (c) consistent accuracy; and (d) universal application.

Only the Landis gives you this cost reducing combination. Only the Landis sizes either external or internal surfaces directly from the work diameter during the entire grinding operation.

LANDIS
TOOL CO., WAYNESBORO, PA.

APEX Floating Tool Holders



Inserted type for screw machine use

Extended type

Compensates for machine spindle misalignment. Apex Floating Holders are designed to permit tools to follow holes on a true line regardless of irregularities in alignment of machine spindle and work. Taps produce threads with uniform pitch diameters. Reamers finish holes true to sze.

Sockets are furnished for Morse Taper or straight shank tools. Shanks are furnished in any taper or straight diametes to fit any size or style of machine spindle, or with adapter shanks to General Motors or Chrysler Motors Standards.

Apex Floating Tool Holders are also furnished with quick change chucks so that collets for Morse Taper or straight shank tools and collets for taps may be quickly changed.

Write or phone for full information on Apex cost reducing tools.

Reamer collet

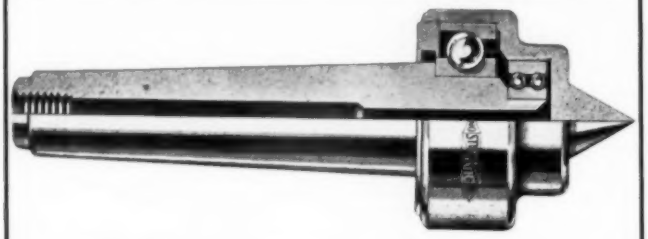
Tap collet

Quick change

THE APEX MACHINE & TOOL CO.

DAYTON, OHIO

DETROIT OFFICE—2832 E. GRAND BLVD. MADISON 4368



STURDIMATIC LIVE CENTERS

for

LATHES, GRINDERS, MILLING MACHINES, ETC.

REQUIRE LESS PRESSURE ON TAILSTOCK
ELIMINATE FRICTION OF DEAD CENTER
DO NOT DISTORT OR DAMAGE CENTER HOLE FOR SUBSEQUENT OPERATIONS
ELIMINATE CHATTER AS THERE IS NO PLAY BETWEEN CENTER AND WORK
THE STURDIMATIC CENTER IS CLOSE TO THE WORK THEREBY REDUCING OVERHANG TO A MINIMUM.

Write for catalog and free trial offer

STURDIMATIC TOOL CO.
5220 Third Ave. Detroit, Michigan

Merry Christmas

and

May 1935 bring you and your organization the utmost in prosperity and happiness

THE GAIRING TOOL COMPANY

Detroit, Michigan

To the A.S.T.E.

a sincere wish for a

Merry Christmas

and a

Happy Prosperous New Year

for all

MOTCH & MERRYWEATHER MACHINERY COMPANY

A Good

Old Fashioned Christmas

and a

Prosperous New Year

to the members of the

American Society of Tool Engineers and Their Friends

is the sincere wish of The Organization of

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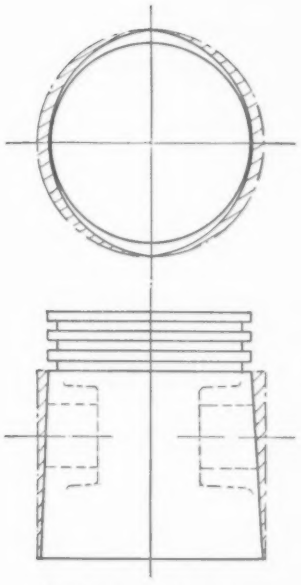
This publication is giving identity to *Tool Engineering*—the profession of which you are a part. Mention *The Journal* when addressing its advertisers.

ELLIPTICAL AND TAPER TURNING . . .

IN ONE OPERATION



.0005" limit can be maintained on the major and minor diameters of the ellipse on the skirt.

The ring land diameters are held perfectly round and the proper taper turned on the skirt in the same operation.

An Ex-Cell-O Junior Double-End Precision Boring Machine, Style No. 1212, with spindle units and fixture for the finish turning of piston diameters in one operation.

The diamond turning of aluminum pistons offers many advantages over the former method of grinding. The metal in the turning operation is cut clean and not torn or dragged, thereby producing a smoother and more uniform finish, which in turn provides a better bearing surface against the cylinder wall. This uniformity also eliminates excessive wear on the pistons and the cylinder bore.

Any taper and ellipse can be simultaneously turned on a production basis to meet the manufacturer's specifications. If desired the ring lands can be turned cylindrical in the same operation. From one to three pistons can be turned at the same time depending upon the Precision Boring Machine used. The turning operation is hydraulically controlled and not dependent upon the operator.

Elliptical and tapered turning represents only one of the many modern precision operations that are being successfully performed on a production basis by the Ex-Cell-O Precision Boring Machine.

XLO

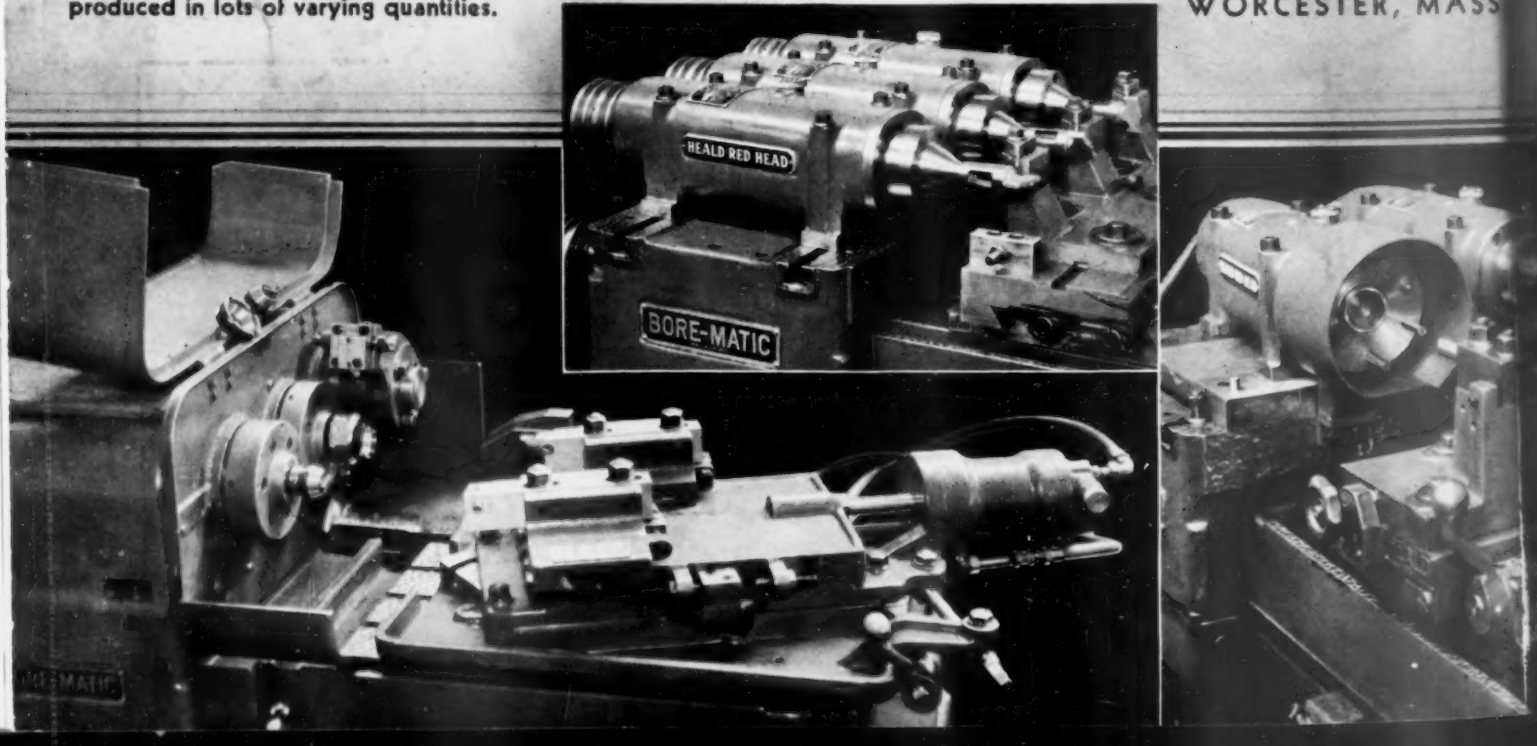
EX-CELL-O AIRCRAFT & TOOL CORPORATION

1200 OAKMAN BLVD. DETROIT, MICH.

Valves and Plugs

Boring the valve body and turning the plug on a Heald Bore-Matic has simplified the manufacture of these parts by eliminating the subsequent finishing operations. So perfect is the bearing of the mating parts including the surface surrounding the ports that leakage is prevented even when there is only a small amount of overlapping surface between the ports of the plug and the body.

Borizing bodies and plugs at the same setting permit a balanced production of each, regardless of the quantity per lot. This, together with the flexibility of the fixture equipment, makes such a layout ideal for plants having a number of different size parts produced in lots of varying quantities.

Below are illustrated three installations of the No. 47 Bore-Matic. Left, this machine is boring, turning and facing valve inserts. Center, arranged with boring heads set at an angle to obtain taper for valve body and plug. Right, three plugs turned at one time after which the tools automatically retract and return to loading position.

THE HEALD MACHINE COMPANY
WORCESTER, MASS.